

CLAIMS

1. A secretory or membrane-binding chimeric protein composed of an energy-generating protein and an energy-receiving protein linked one another wherein energy transfer can arise between the energy-generating protein and the energy-receiving protein.
2. The secretory or membrane-binding chimeric protein according to claim 1 having any structure of the following 1) to 6):
  - 1) [secretory energy-generating protein]-[energy-receiving protein];
  - 2) [secretory energy-receiving protein]-[energy-generating protein];
  - 3) [membrane-binding energy-generating protein]-[energy-receiving protein];
  - 4) [membrane-binding energy-receiving protein]-[energy-generating protein];
  - 5) [signal peptide]-[energy-generating protein]-[energy-receiving protein]; and
  - 6) [signal peptide]-[energy-receiving protein]-[energy-generating protein].
3. The chimeric protein according to claim 1 wherein a monitor peptide is introduced between the energy-generating protein and the energy-receiving protein or inside the energy-generating protein or inside energy-receiving protein so as to retain an energy-generating property or an energy-receiving property, and the energy transfer is inhibited by cleaving the monitor peptide.
4. The chimeric protein according to any of claims 1 to 3 wherein the energy-generating protein is a photoprotein.
5. The chimeric protein according to claim 4 wherein the photoprotein is luciferase.

6. The chimeric protein according to any of claims 1 to 3 wherein the energy-receiving protein is a fluorescent protein or a colored protein.

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7. The chimeric protein according to claim 6 wherein the fluorescent protein is GFP, YFP, BFP, CFP, DsRED or RFP.

8. The chimeric protein according to claim 1 having an amino acid sequence represented by SEQ ID NO:1.

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9. A polynucleotide encoding the secretory or membrane-binding chimeric protein according to any of claims 1 to 8, or a complementary chain thereof.

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10. A vector comprising the polynucleotide according to claim 9.

11. A transformant transformed with the vector according to claim 10.

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12. A method for producing a secretory or membrane-binding chimeric protein including a step of culturing the transformant according to claim 11 in a medium, and a step of collecting the secretory or membrane-binding chimeric protein from the medium.

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13. A method for measuring a gene transcription activity in a host cell, characterized in that the transformant according to claim 11 is cultured and energy transfer in a secretory or membrane-binding chimeric protein secreted in a medium or bound to a cell membrane is quantified.

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14. A method for screening a drug which regulates gene expression in a cell, including a step of culturing the transformant according to claim 11 in the presence of a drug candidate compound in a medium, and a step of quantitatively

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comparing energy transfer in a secretory or membrane-binding chimeric protein secreted in the medium or bound to a cell membrane in the presence or absence of the candidate compound.

- 5    15.    The method according to claim 14 wherein the drug which regulates the gene expression in the cell is a drug which regulates gene transcription expression or an enzyme activity of an enzyme which regulates protein modification.
- 10   16.    The method according to claim 14 wherein the transformant comprises a polynucleotide sequence represented by SEQ ID NO:1.